

9/26/16 "The will to exceed is important, but what's more important is the will to prepare"  
-Bobby Knight

HW: "Equations with Rational Exponents" #1-13  
Test 2 on Wednesday 10/19

AIM: How do we solve exponential equations with variables in the base?

Warm Up:

1) Rewrite using <sup>(fraction)</sup> rational exponents

$$\sqrt[3]{x^5} = x^{\frac{5}{3}}$$

⊗ Power  
Root

2) What is the multiplicative inverse of  $-6$ ?  
<sup>(reciprocal)</sup>

↙

$$\left(-\frac{1}{6}\right)$$



Brain Food:

When we solve for a variable, what is the exponent of that variable?

ONE

3) Solve for  $x$ :

$$3) \quad x^{\frac{2}{3}(\frac{3}{2})} = 25^{\frac{3}{2}}$$

multiplicative Inverse

$$x' = \pm 125$$

$$x = 125 \quad \text{and} \quad x = -125$$

M.I.T.

⊛ If a variable is raised to an even <sup>odd</sup> power, there will be 2 solutions.  
(need  $\pm$ )

Solve for all values of  $x$ :

To Solve  
Do BACKWARDS  
PEMDAS<sup>1st</sup>

$$2) \quad 2x^{-3} - 1 = 15$$

$+1 \quad +1$

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A blue horizontal line is drawn under the equation, with the numbers +1 and +1 written below the minus sign and the constant 15 respectively.

$$\frac{2x^{-3}}{2} = \frac{16}{2}$$

$$x^{-3} \left( \frac{-1}{3} \right) = 8 \left( \frac{-1}{3} \right)$$

$$x = \frac{1}{2}$$

\* (can be:  $\{ \} [ ] \sqrt{\phantom{x}}$ )

\* PEMDAS

In the order you see them  
Left to Right  
(First MD)  
2<sup>nd</sup> AS

To Evaluate given a value  $\longrightarrow$

$\longleftarrow$  To Solve for a variable

$$3) \quad \frac{2x^{\frac{1}{4}}}{2} = \frac{12}{2}$$

$$x^{\frac{1}{4} \left( \frac{-4}{1} \right)} = 6^{\left( \frac{-4}{1} \right)}$$

$$x = \frac{1}{1296}$$

$$5) \quad 3(2x+3)^{\frac{2}{3}} + 2 = 77$$

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$$\frac{3(2x+3)^{\frac{2}{3}}}{3} = \frac{75}{3}$$

Even  
odd

$$(2x+3)^{\frac{2}{3} \cdot \frac{3}{2}} = 25^{\frac{3}{2}}$$

$$2x+3 = \pm 125$$

$$\begin{array}{r} 2x+3 = 125 \\ -3 \quad -3 \\ \hline 2x = 122 \\ \frac{2x}{2} = \frac{122}{2} \end{array}$$

$$x = 61$$

$$\begin{array}{r} 2x+3 = -125 \\ -3 \quad -3 \\ \hline 2x = -128 \\ \frac{2x}{2} = \frac{-128}{2} \end{array}$$

$$x = -64$$

Solve on calc.

$y^1$  = Left side of equal sign

$y^2$  = Right side of equal sign

2nd Trace 5

Enter Enter Enter